TRACTOR WITH IMPROVED VALVE SYSTEM

Abstract of the Disclosure

A hydraulically powered tractor includes an elongated body, two gripper assemblies, at least one pair of aft and forward propulsion cylinders and pistons, and a valve system. The valve system comprises an inlet control valve, a two-position propulsion control valve, a two-position gripper control valve, two cycle valves, and two pressure reduction valves. The inlet control valve spool includes a hydraulically controlled deactivation cam that locks the valve in a closed position, rendering the tractor non-operational. The propulsion control valve is piloted on both ends by fluid pressure in the gripper assemblies. The propulsion control valve controls the distribution of operating fluid to and from the propulsion cylinders, such that one cylinder performs a power stroke while the other cylinder performs a reset stroke. Each end of the gripper control valve is piloted by a source of high-pressure fluid selectively admitted by one of the cycle valves. The gripper control valve controls the distribution of operating fluid to and from the gripper assemblies. The cycle valves are spring-biased and piloted by fluid pressure in the propulsion cylinders, so that the gripper control valve shifts only after the cylinders complete their strokes. The pressure reduction valves limit the pressure within the gripper assemblies. These valves are spring-biased and piloted by the pressure of fluid flowing into the gripper assemblies. Some or all of the valves include centering grooves on the landings of the spools, which reduce leakage and produce more efficient operation. The propulsion control and gripper control valves include spring-assisted detents to prevent inadvertent shifting.

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